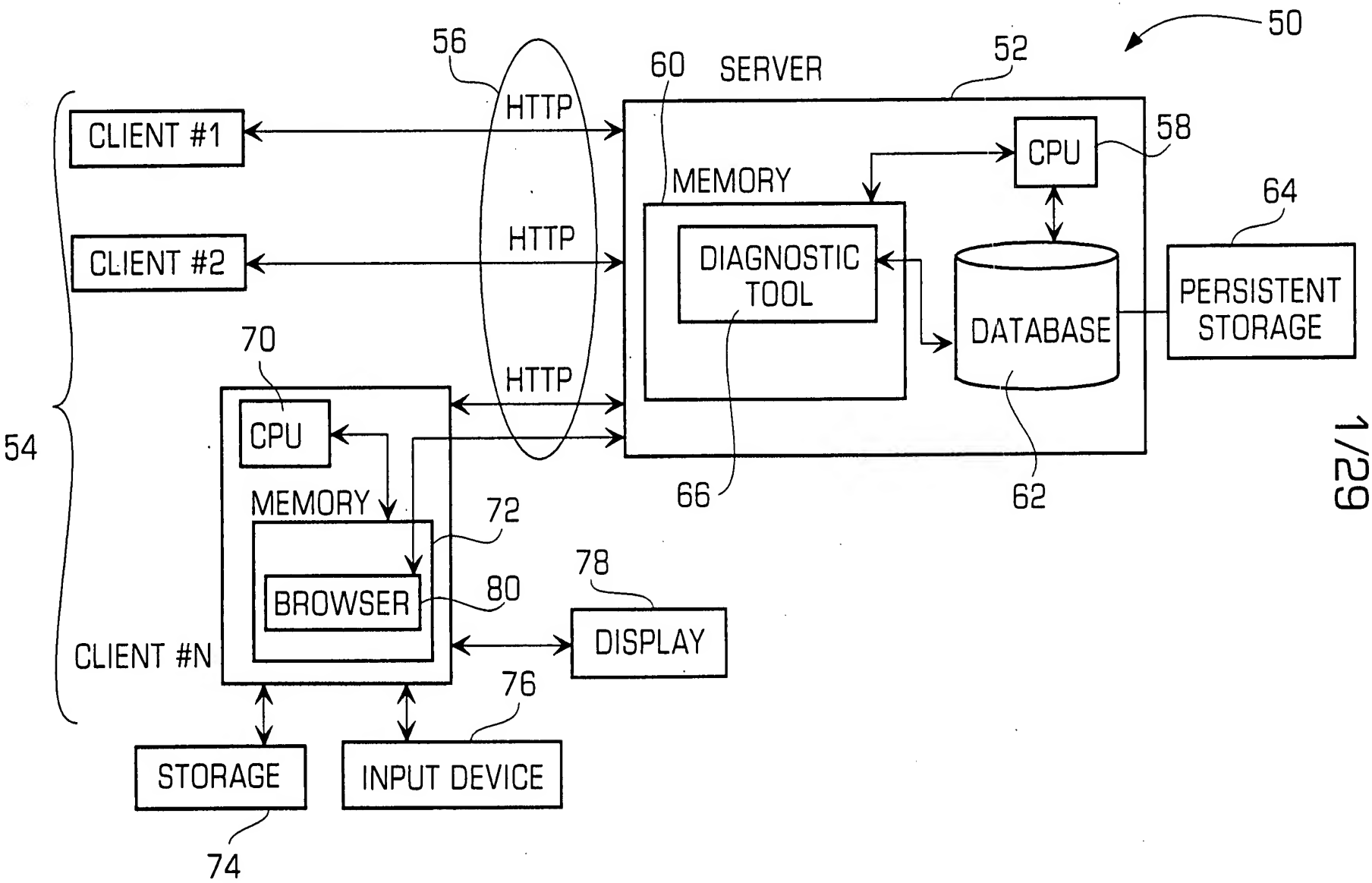

50
56
HTTP
60
SERVER
52
CLIENT #1
CPU
58
MEMORY
64
CLIENT #2
HTTP
DIAGNOSTIC TOOL
DATABASE
PERSISTENT STORAGE
70
HTTP
54
CPU
MEMORY
72
66
62
78
BROWSER
80
CLIENT #N
DISPLAY
76
STORAGE
INPUT DEVICE
74

FIGURE 1A

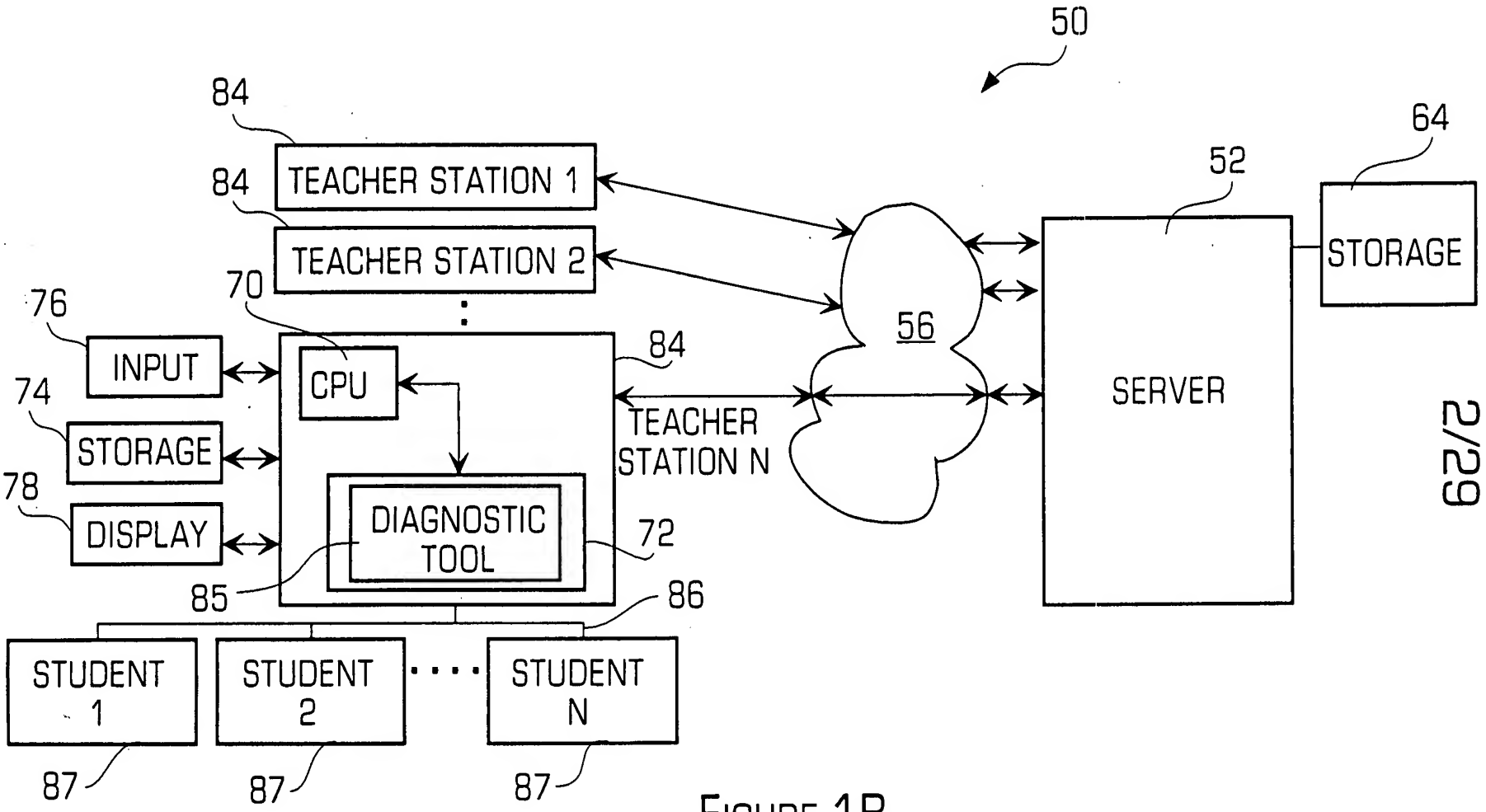

50
84
TEACHER STATION 1
84
TEACHER STATION 2
70
76
INPUT
74
STORAGE
78
DISPLAY
CPU
DIAGNOSTIC TOOL
85
72
84
TEACHER STATION N
56
52
SERVER
64
STORAGE
86
STUDENT 1
STUDENT 2
STUDENT N
87
87
87

FIGURE 1B

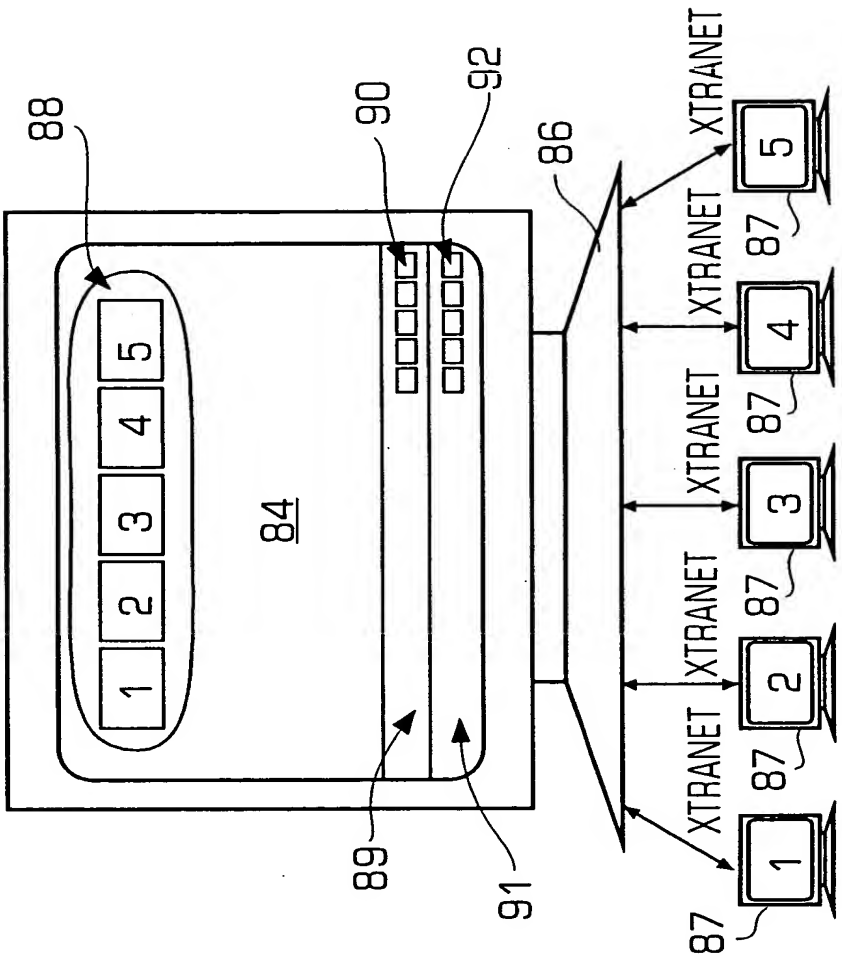


FIGURE 1C

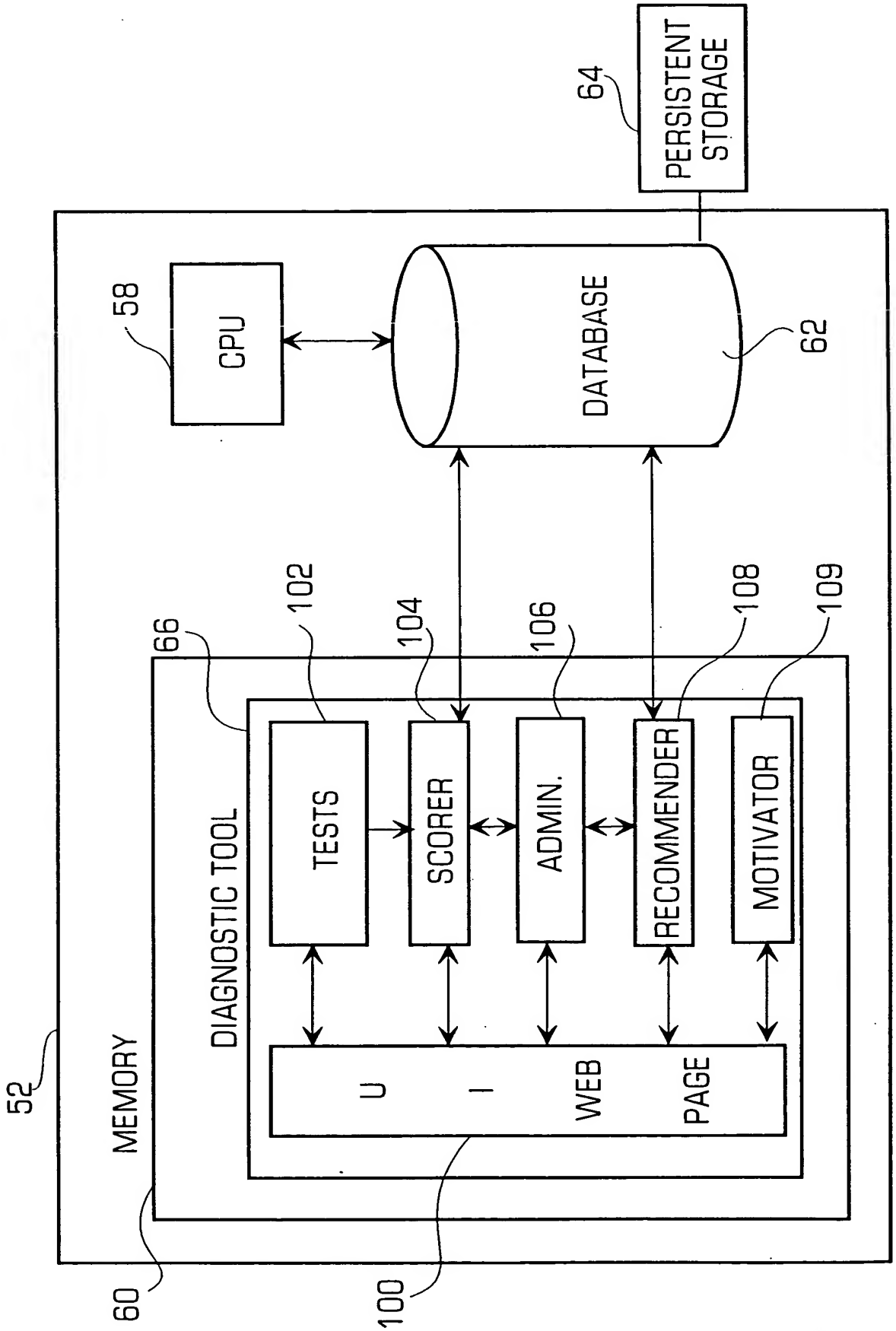

52
MEMORY
60
DIAGNOSTIC TOOL
66
TESTS
102
SCORER
104
ADMIN.
106
RECOMMENDER
108
MOTIVATOR
109
U I WEB PAGE
100
CPU
58
DATABASE
62
PERSISTENT STORAGE
64

FIGURE 2

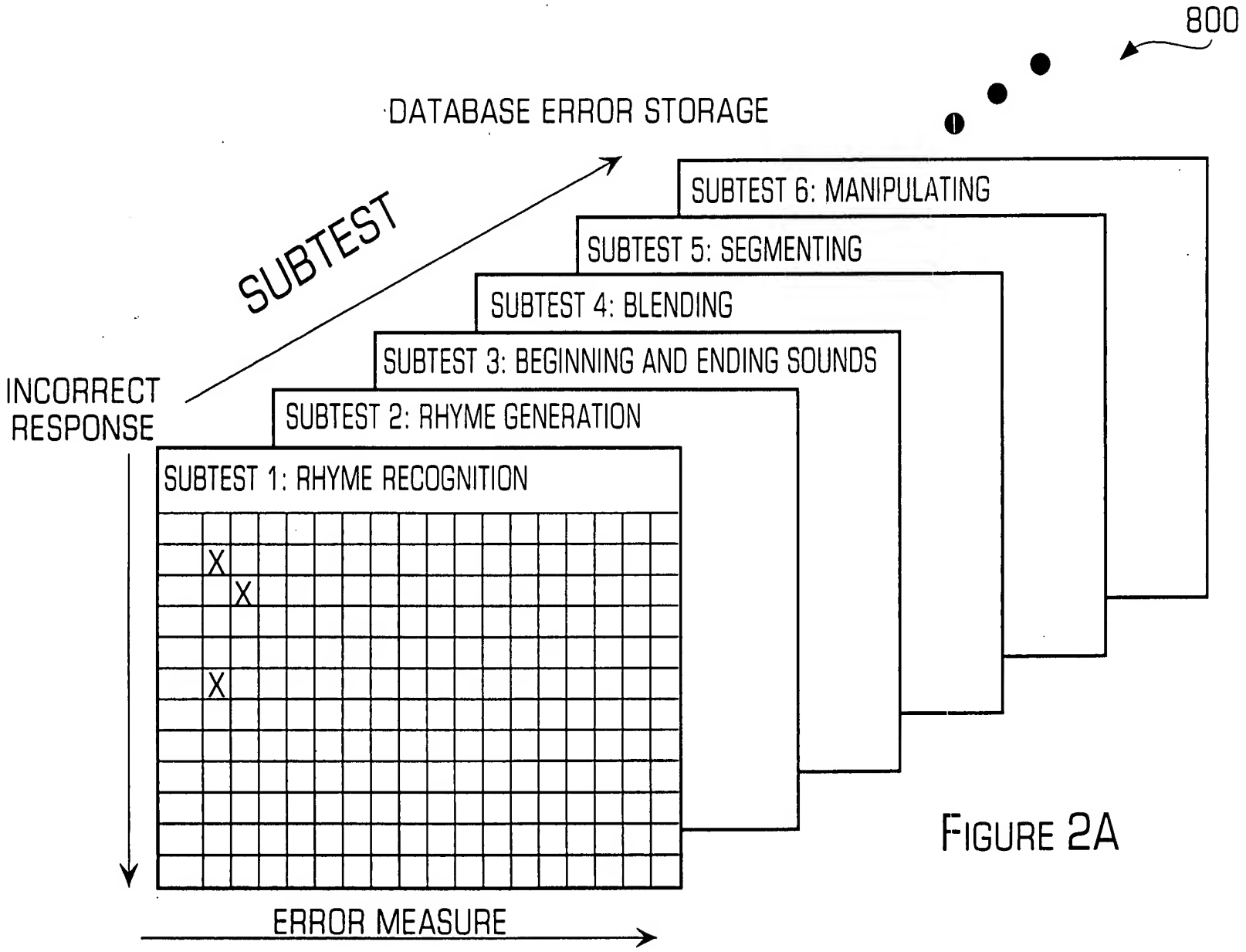
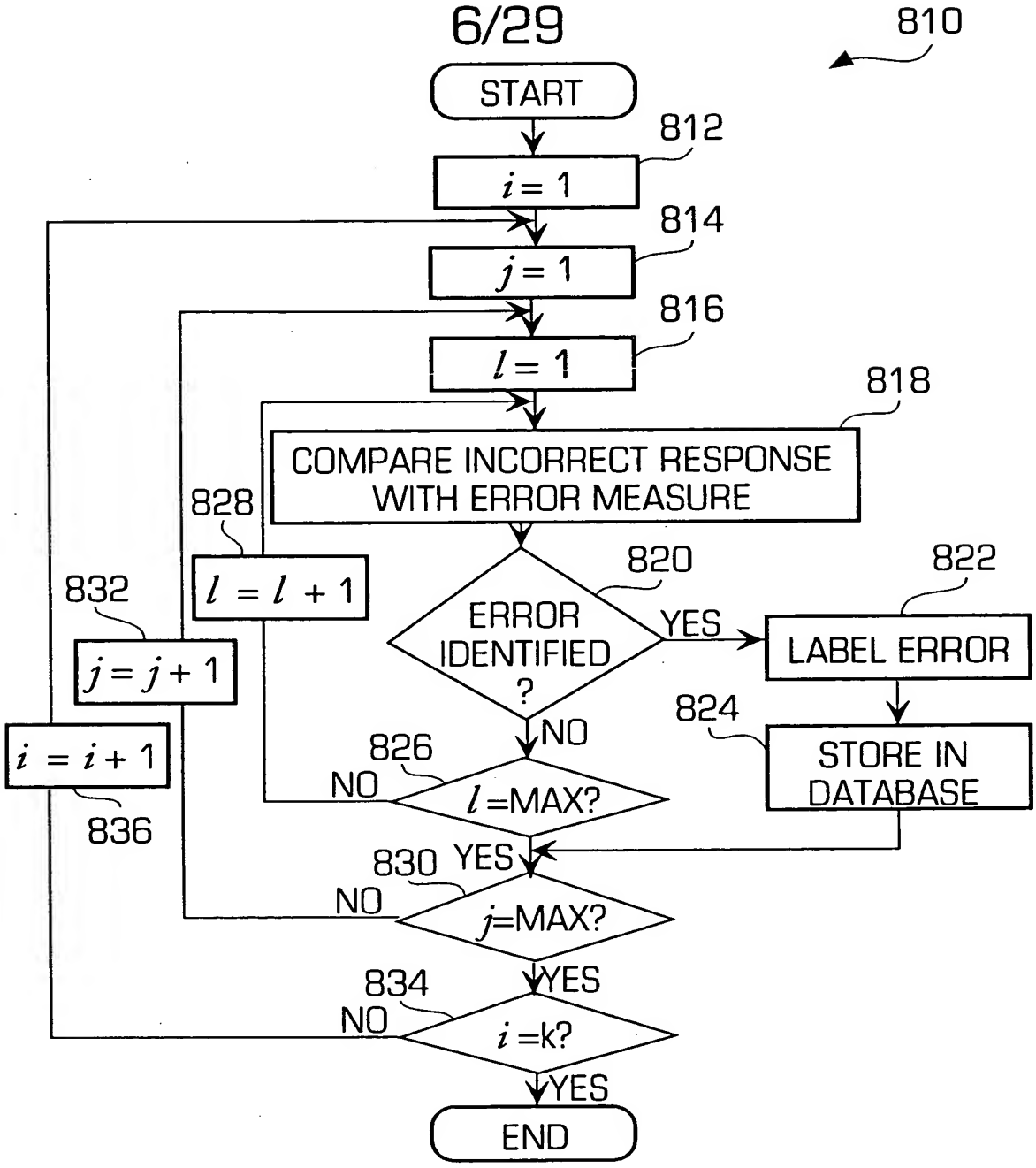

800
DATABASE ERROR STORAGE
SUBTEST
SUBTEST 6: MANIPULATING
SUBTEST 5: SEGMENTING
SUBTEST 4: BLENDING
SUBTEST 3: BEGINNING AND ENDING SOUNDS
SUBTEST 2: RHYME GENERATION
SUBTEST 1: RHYME RECOGNITION
INCORRECT RESPONSE
ERROR MEASURE

FIGURE 2A



$(ST)_i$: SUBTEST; i =1...k

$(IR)ij$: INCORRECT RESPONSE; ij = 1.1, 1.2, ..., 1.MAX., ...K.1, K.2, ..., K.MAX. (j=1 ...MAX.)

$(EM)il$: ERROR MEASURE; il = 1.1, 1.2, ..., 1.MAX, ...K.1, K.2, ..., K.MAX. (l = 1 ... MAX.

NOTE: MAX. FOR l IS DIFFERENT FROM MAX. FOR j.)

FIGURE 2B

IF - THEN RULE BASES

SUBTEST	ERROR MEASURE						
1. RHYME RECOGNITION	①	②	③	④	...		n_1
2. RHYME GENERATION	①	②	③	④	...		n_2
3. BEGINNING AND ENDING SOUNDS	① RULE 1	② RULE 1	③	④	...		n_3
4. BLENDING	①	② RULE 1	③	④	...		n_4
5. SEGMENTING	①	②	③	④	...		n_5
6. MANIPULATING	①	②	③	④	...		n_6
7. RECALLING IN SEQUENTIAL ORDER	①	②	③	④	...		n_7
8. RAPID NAMING	①	②	③	④	...		n_8
9. LETTER NAMES AND SOUND	①	②	③	④	...		n_9
10. DECODING	①	②	③	④	...		n_{10}
11. FLUENT READING	①	②	③	④	...		n_{11}

FIG. 2C

SUBTEST	ERROR MEASURE ID	ERROR MEASURE
3. BEGINNING AND ENDING SOUNDS	2	DO NOT RECOGNIZE /f/ WHEN IT IS AT THE END FOLLOWING AN /i/ SOUND
4. BLENDING	3	CAN NOT BLEND WHEN /f/ IS AT THE END FOLLOWING AN /e/ SOUND
5. SEGMENTING	4	DO NOT COUNT /f/ WHEN IT IS AT THE END FOLLOWING AN /^/ SOUND
6. MANIPULATING	4	CAN NOT REPLACE /f/ WITH /v/ WHEN IT IS AT THE END FOLLOWING AN /e/ SOUND
7. RECALLING IN SEQUENTIAL ORDER	3	DO NOT RECALL /f/ WHEN IT IS AT THE END FOLLOWING ANOTHER CONSONANT.
9. LETTER NAMES AND SOUND	4	CAN NOT RECOGNIZE /f/ SOUND WHEN IT IS ISOLATED
10. DECODING	2	CANNOT RECOGNIZE THE NONSENSE WORD WHEN THE WORD ENDS WITH A /f/ SOUND WHICH FOLLOWS ANOTHER CONSONANT

FIGURE 2D

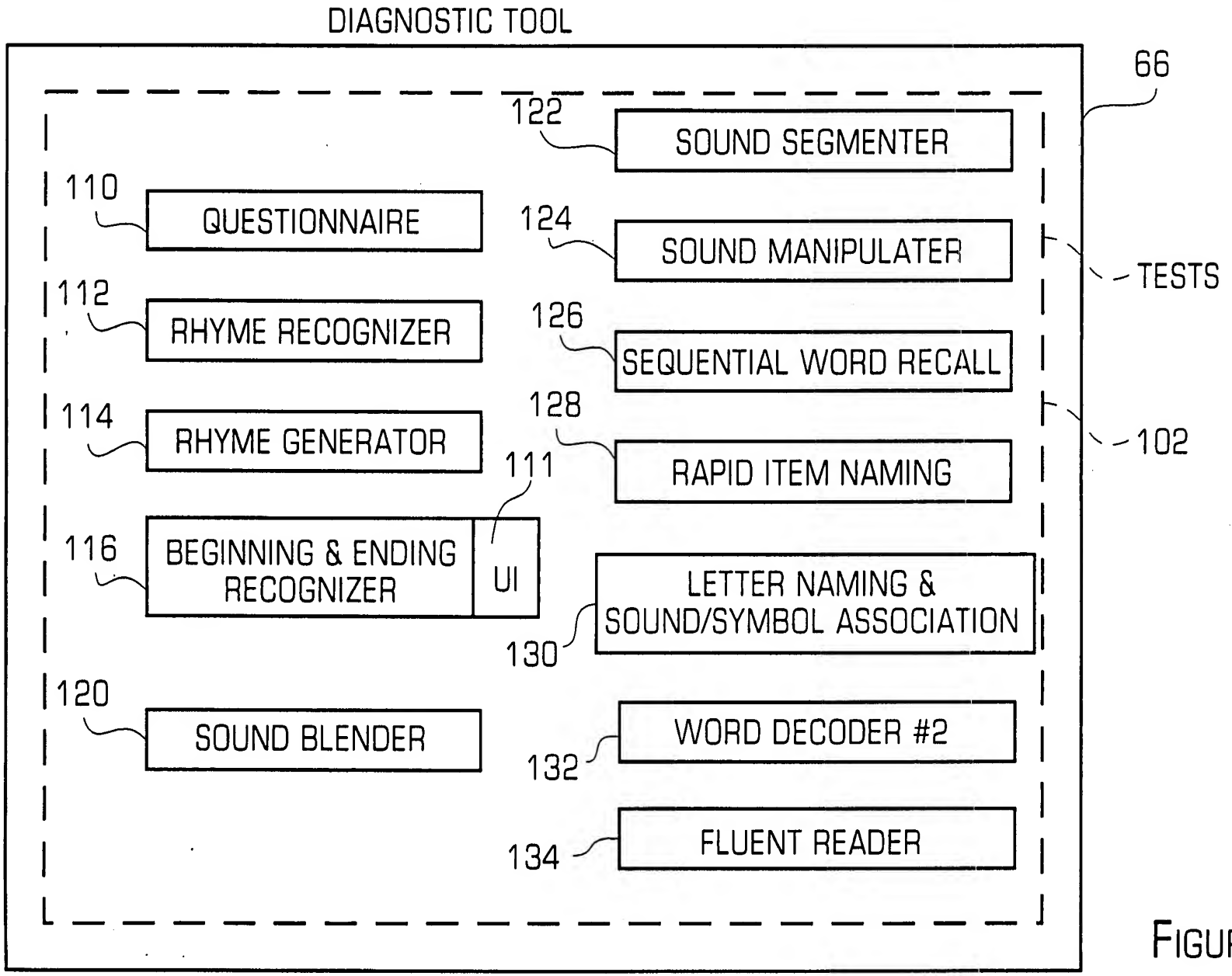

DIAGNOSTIC TOOL
66
122
SOUND SEGMENTER
110
QUESTIONNAIRE
124
SOUND MANIPULATER
TESTS
112
RHYME RECOGNIZER
126
SEQUENTIAL WORD RECALL
114
RHYME GENERATOR
128
RAPID ITEM NAMING
102
111
116
BEGINNING & ENDING RECOGNIZER
UI
LETTER NAMING & SOUND/SYMBOL ASSOCIATION
130
120
SOUND BLENDER
WORD DECODER #2
132
FLUENT READER
134

FIGURE 3

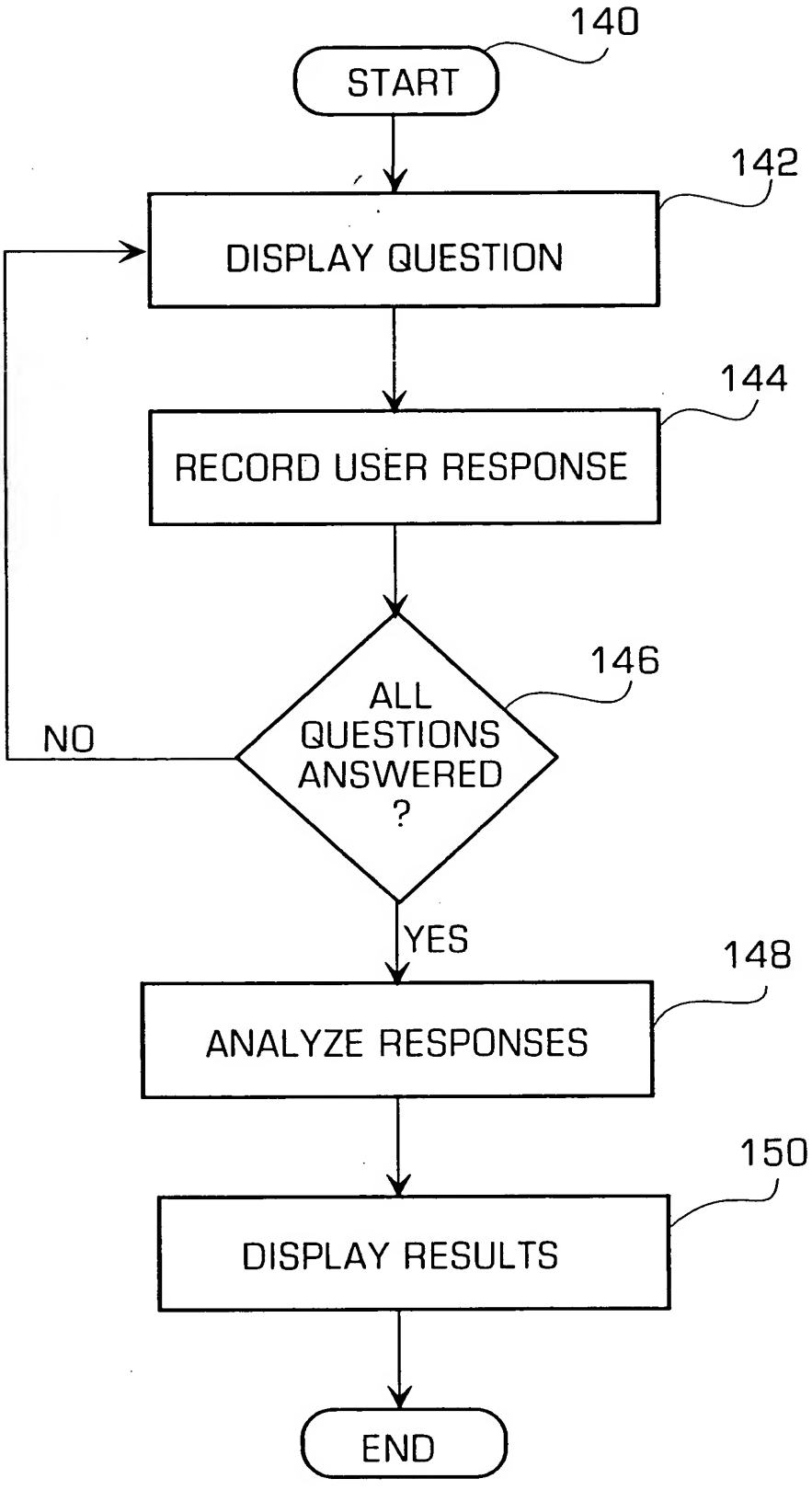

140
START
142
DISPLAY QUESTION
144
RECORD USER RESPONSE
146
ALL QUESTIONS ANSWERED ?
NO
YES
148
ANALYZE RESPONSES
150
DISPLAY RESULTS
END

FIGURE 4

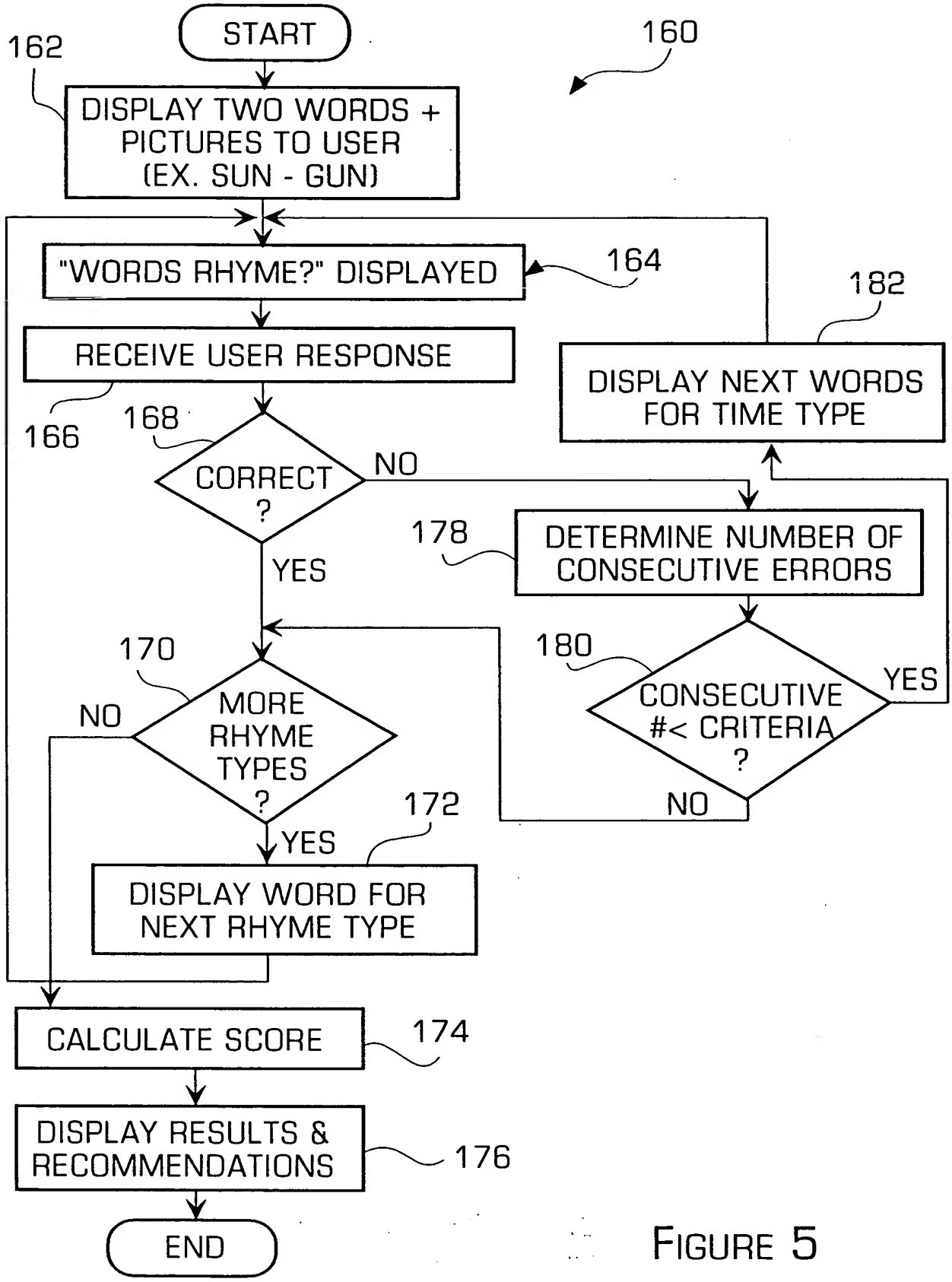

START
160
162
DISPLAY TWO WORDS + PICTURES TO USER (EX. SUN - GUN)
"WORDS RHYME?" DISPLAYED
164
182
RECEIVE USER RESPONSE
DISPLAY NEXT WORDS FOR TIME TYPE
166
168
CORRECT ?
NO
178
DETERMINE NUMBER OF CONSECUTIVE ERRORS
YES
170
180
MORE RHYME TYPES ?
CONSECUTIVE #< CRITERIA ?
YES
NO
NO
172
YES
DISPLAY WORD FOR NEXT RHYME TYPE
CALCULATE SCORE
174
DISPLAY RESULTS & RECOMMENDATIONS
176
END

FIGURE 5

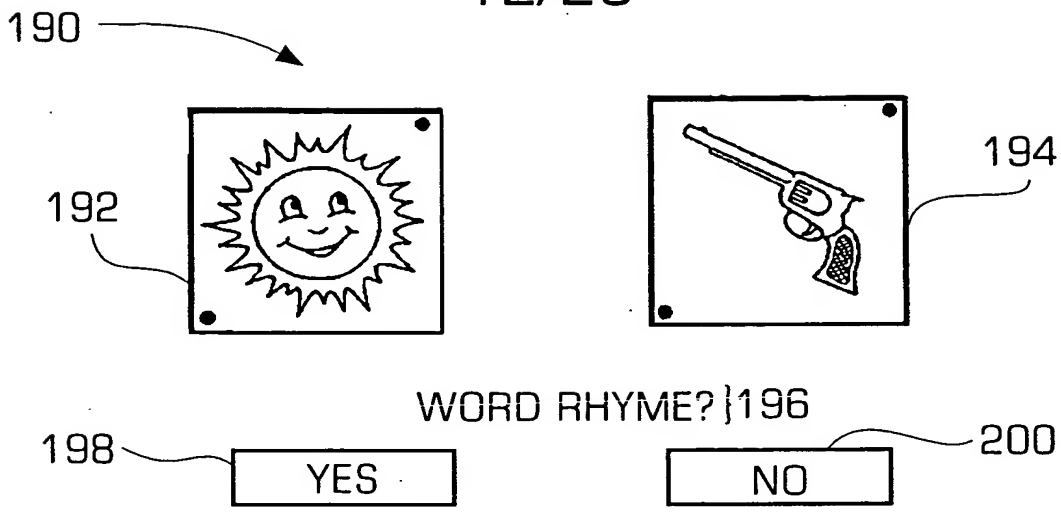


FIGURE 6

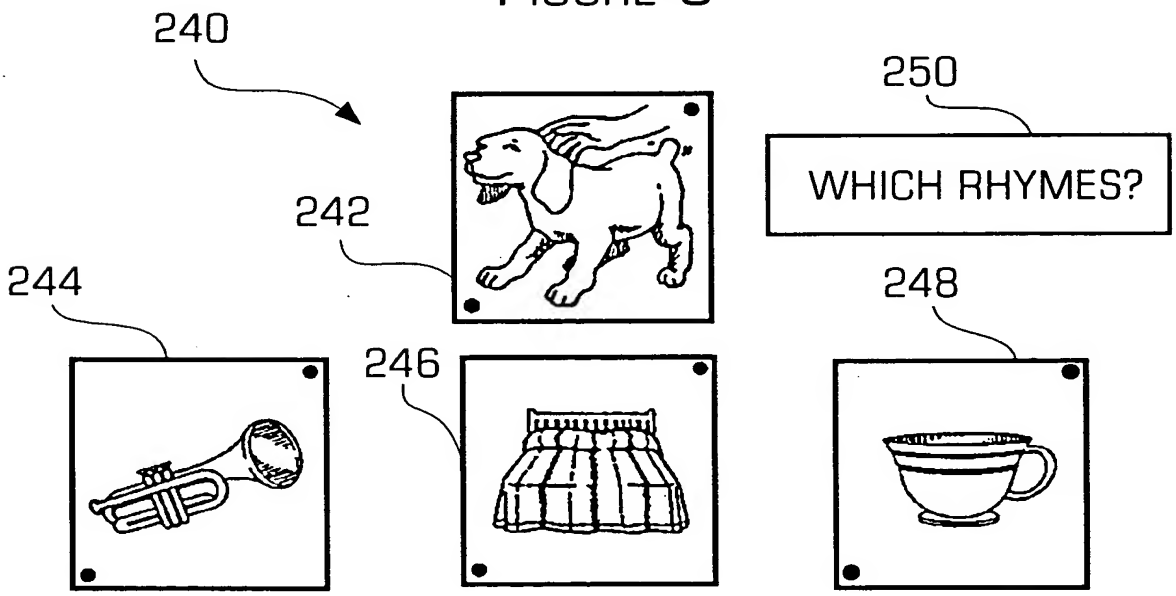


FIGURE 8

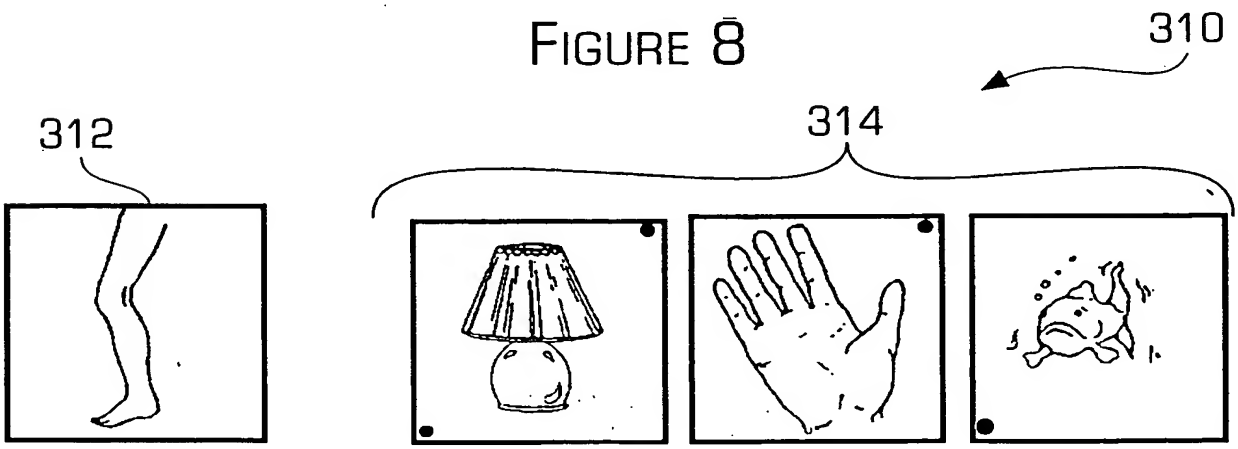


FIGURE 10

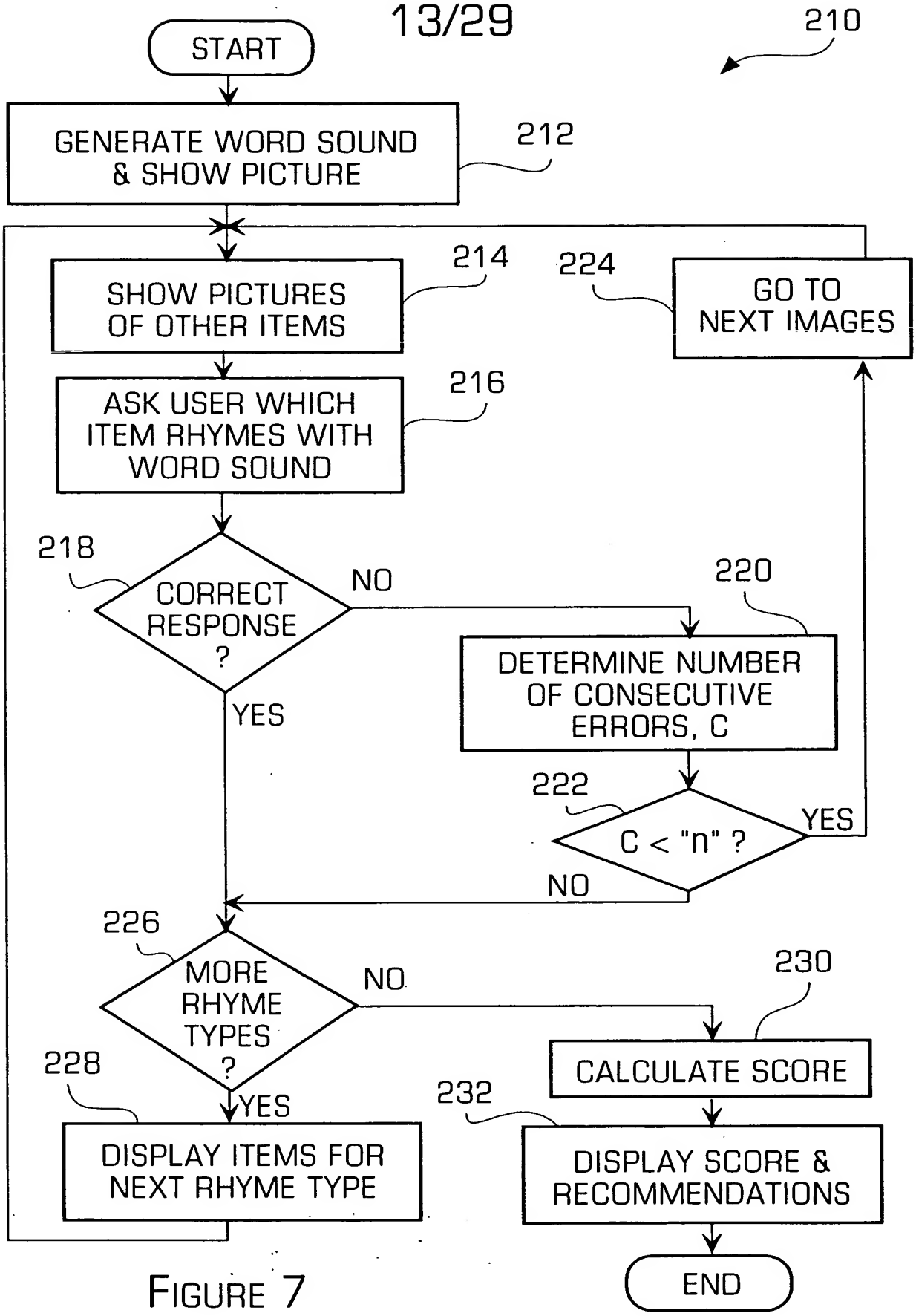

210
START
GENERATE WORD SOUND & SHOW PICTURE
212
SHOW PICTURES OF OTHER ITEMS
214
ASK USER WHICH ITEM RHYMES WITH WORD SOUND
216
218
CORRECT RESPONSE ?
NO
220
DETERMINE NUMBER OF CONSECUTIVE ERRORS, C
YES
222
C < "n" ?
YES
NO
224
GO TO NEXT IMAGES
226
MORE RHYME TYPES ?
NO
230
CALCULATE SCORE
228
YES
DISPLAY ITEMS FOR NEXT RHYME TYPE
232
DISPLAY SCORE & RECOMMENDATIONS
END

FIGURE 7

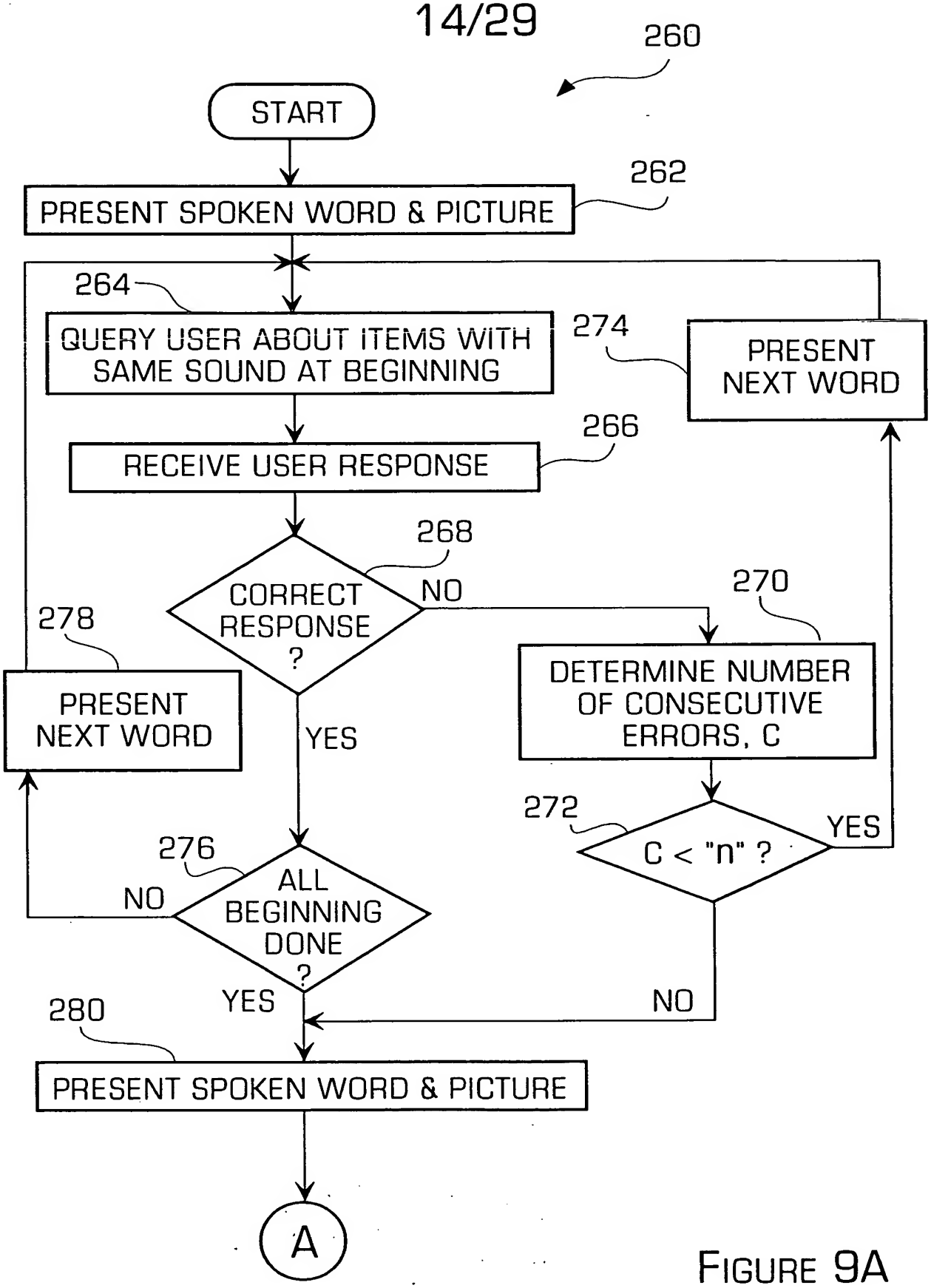

260
START
262
PRESENT SPOKEN WORD & PICTURE
264
QUERY USER ABOUT ITEMS WITH SAME SOUND AT BEGINNING
274
PRESENT NEXT WORD
266
RECEIVE USER RESPONSE
268
CORRECT RESPONSE ?
NO
270
278
PRESENT NEXT WORD
YES
DETERMINE NUMBER OF CONSECUTIVE ERRORS, C
272
C < "n" ?
YES
276
ALL BEGINNING DONE ?
NO
YES
NO
280
PRESENT SPOKEN WORD & PICTURE
A

FIGURE 9A

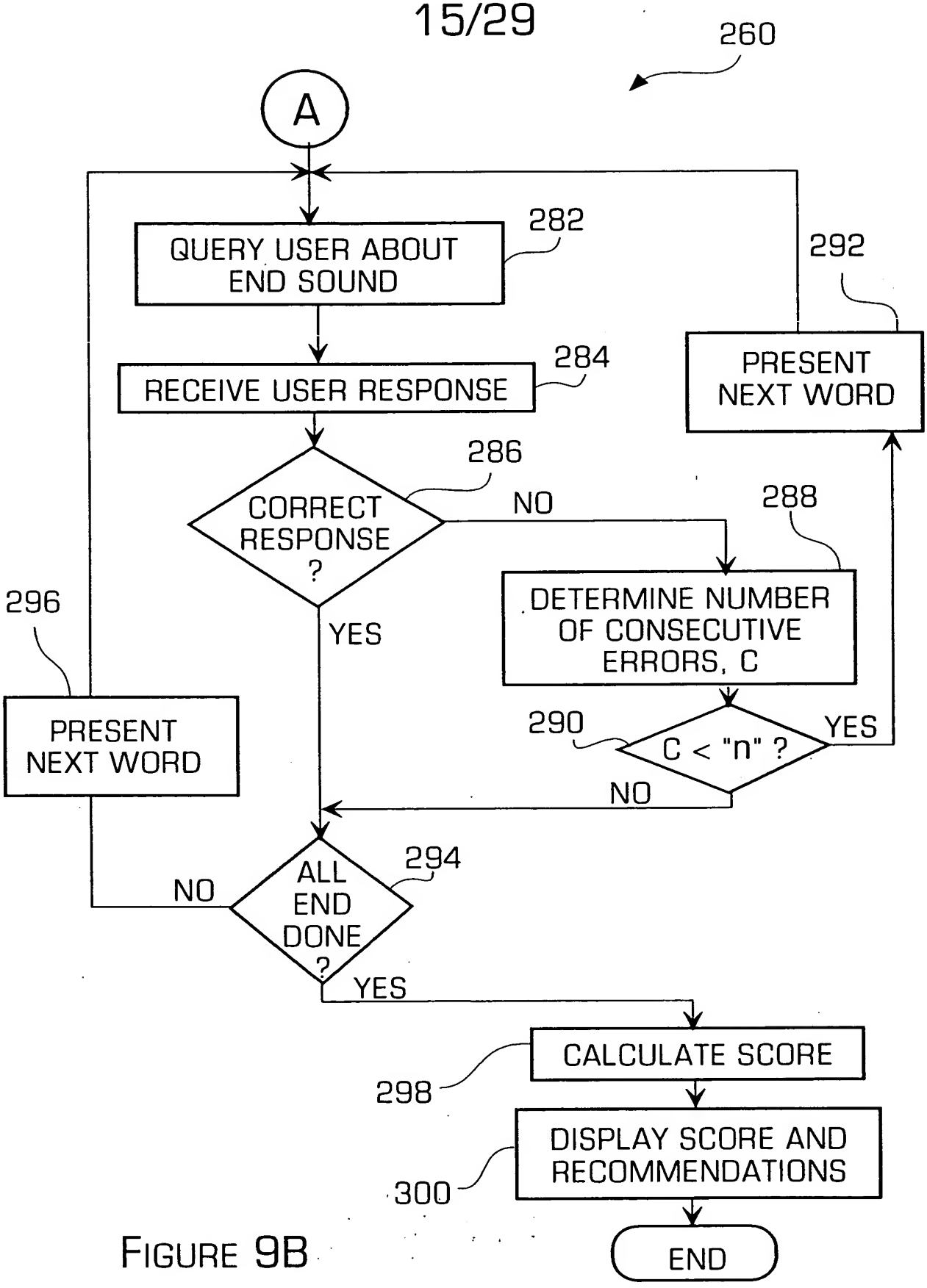

260
A
QUERY USER ABOUT END SOUND
282
RECEIVE USER RESPONSE
284
CORRECT RESPONSE ?
286
NO
YES
DETERMINE NUMBER OF CONSECUTIVE ERRORS, C
288
C < "n" ?
290
YES
NO
PRESENT NEXT WORD
292
PRESENT NEXT WORD
296
ALL END DONE ?
294
NO
YES
CALCULATE SCORE
298
DISPLAY SCORE AND RECOMMENDATIONS
300
END

FIGURE 9B

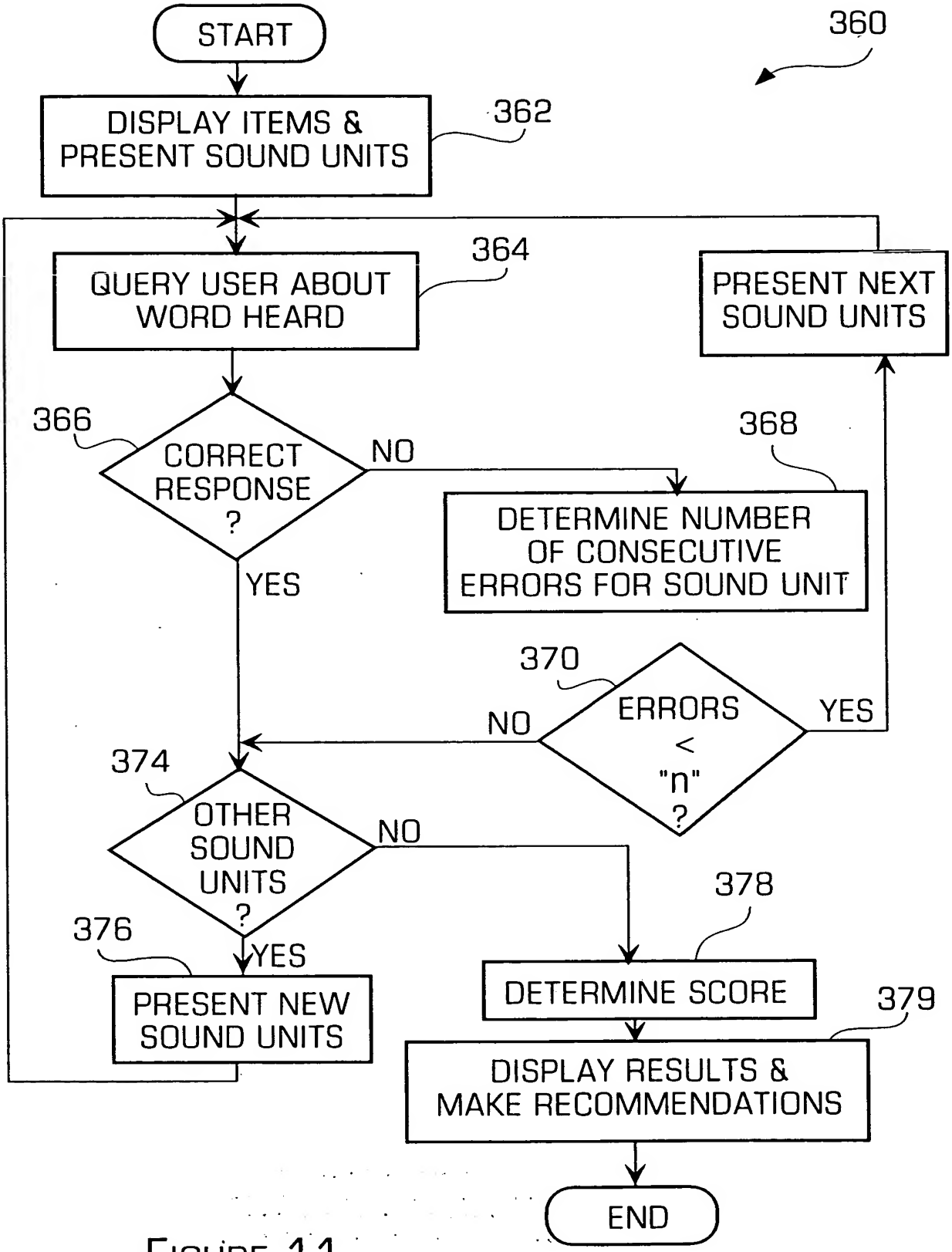

START
360
DISPLAY ITEMS & PRESENT SOUND UNITS
362
QUERY USER ABOUT WORD HEARD
364
PRESENT NEXT SOUND UNITS
366
CORRECT RESPONSE ?
NO
368
DETERMINE NUMBER OF CONSECUTIVE ERRORS FOR SOUND UNIT
YES
370
ERRORS < "n" ?
NO
YES
374
OTHER SOUND UNITS ?
NO
378
376
YES
PRESENT NEW SOUND UNITS
DETERMINE SCORE
379
DISPLAY RESULTS & MAKE RECOMMENDATIONS
END

FIGURE 11

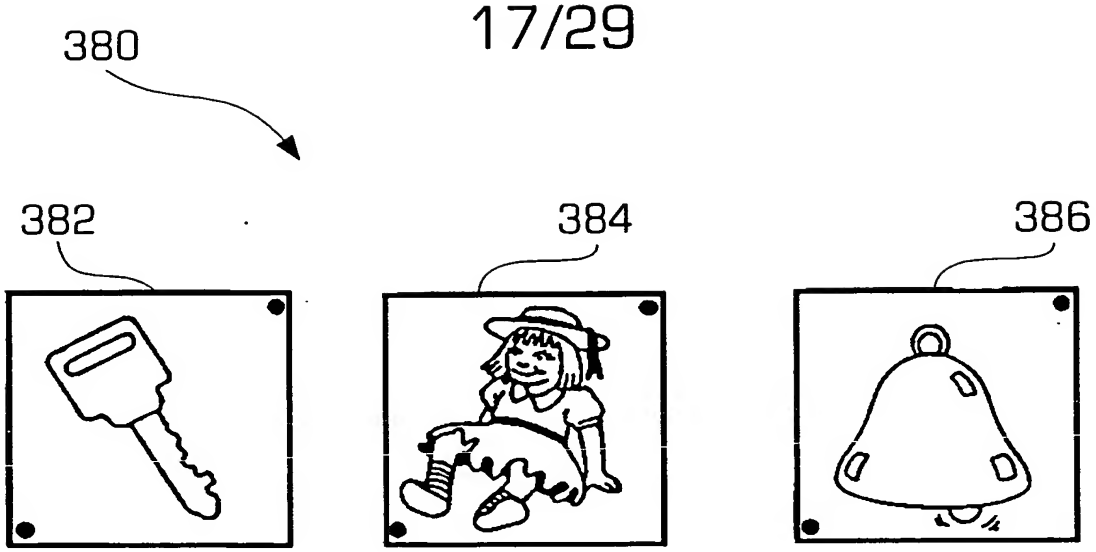


FIGURE 12

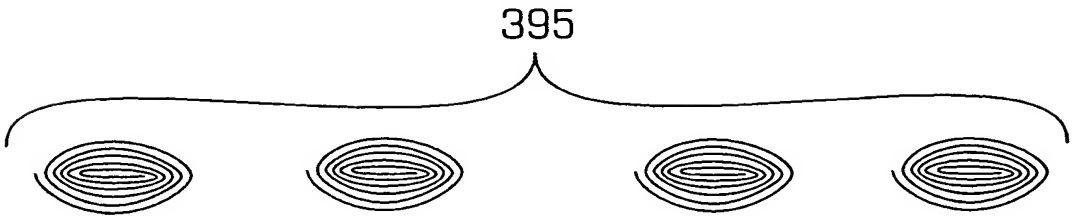


FIGURE 14

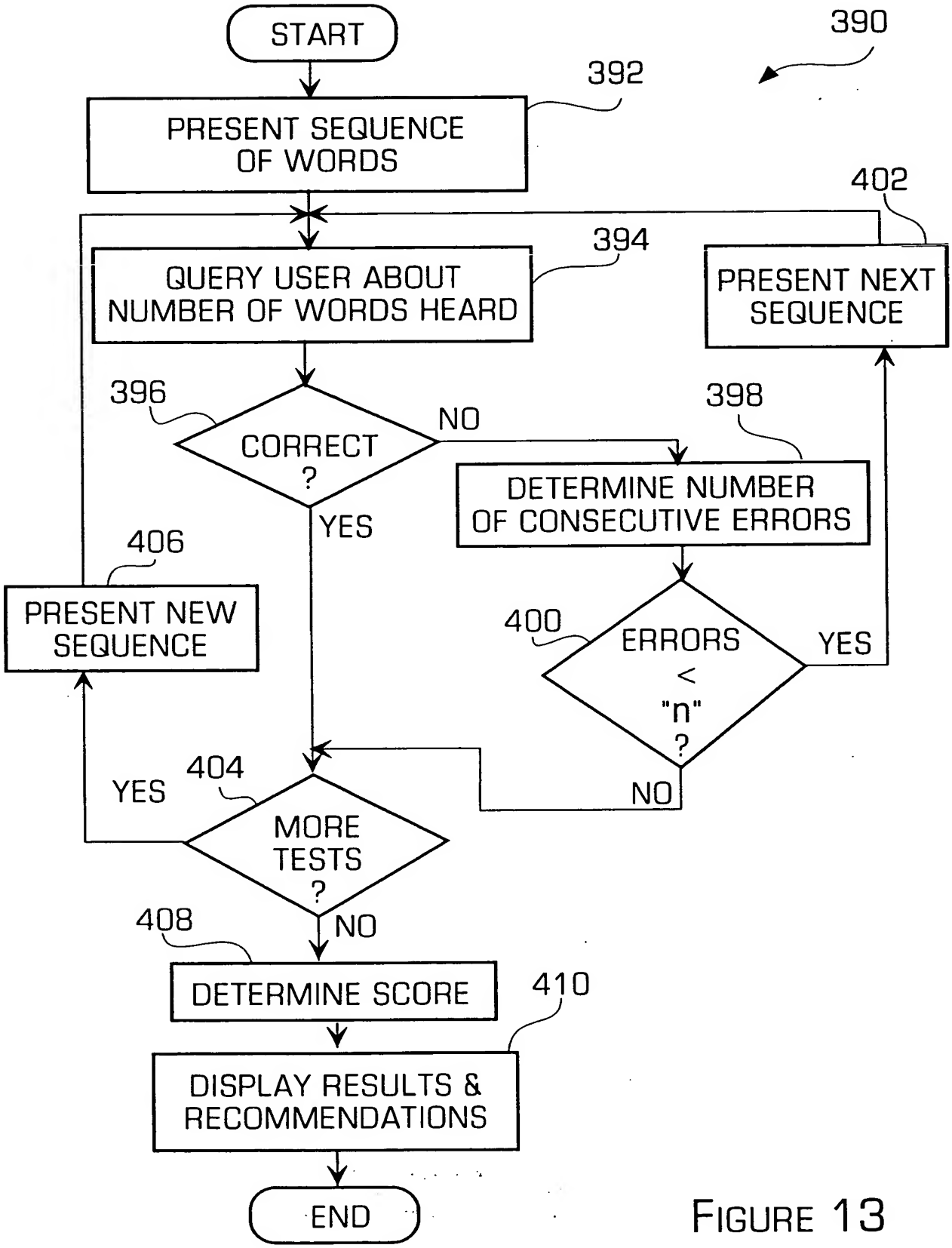

START
390
392
PRESENT SEQUENCE OF WORDS
402
394
QUERY USER ABOUT NUMBER OF WORDS HEARD
PRESENT NEXT SEQUENCE
396
CORRECT ?
NO
398
DETERMINE NUMBER OF CONSECUTIVE ERRORS
YES
406
PRESENT NEW SEQUENCE
400
ERRORS < "n" ?
YES
NO
404
YES
MORE TESTS ?
NO
408
DETERMINE SCORE
410
DISPLAY RESULTS & RECOMMENDATIONS
END

FIGURE 13

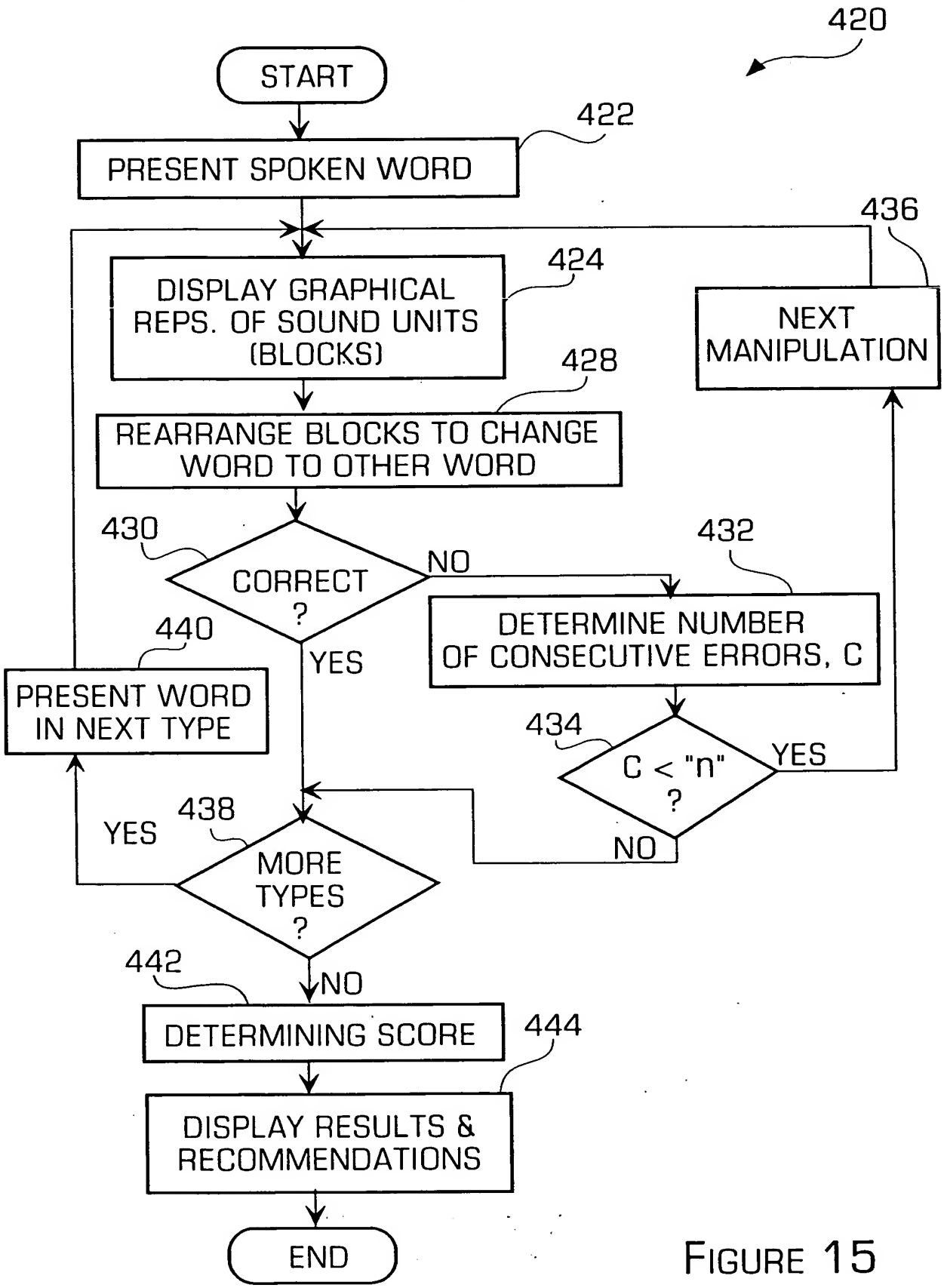

420
START
422
PRESENT SPOKEN WORD
436
424
DISPLAY GRAPHICAL REPS. OF SOUND UNITS (BLOCKS)
NEXT MANIPULATION
428
REARRANGE BLOCKS TO CHANGE WORD TO OTHER WORD
430
CORRECT ?
NO
432
DETERMINE NUMBER OF CONSECUTIVE ERRORS, C
440
YES
PRESENT WORD IN NEXT TYPE
434
C < "n" ?
YES
438
YES
MORE TYPES ?
NO
442
NO
DETERMINING SCORE
444
DISPLAY RESULTS & RECOMMENDATIONS
END

FIGURE 15

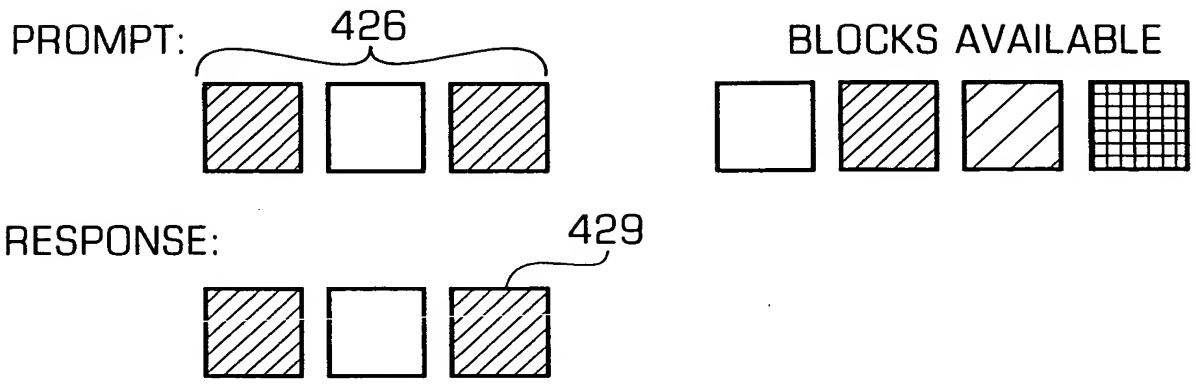


FIGURE 16

1	6	2
4		9
5	8	3

FIGURE 18

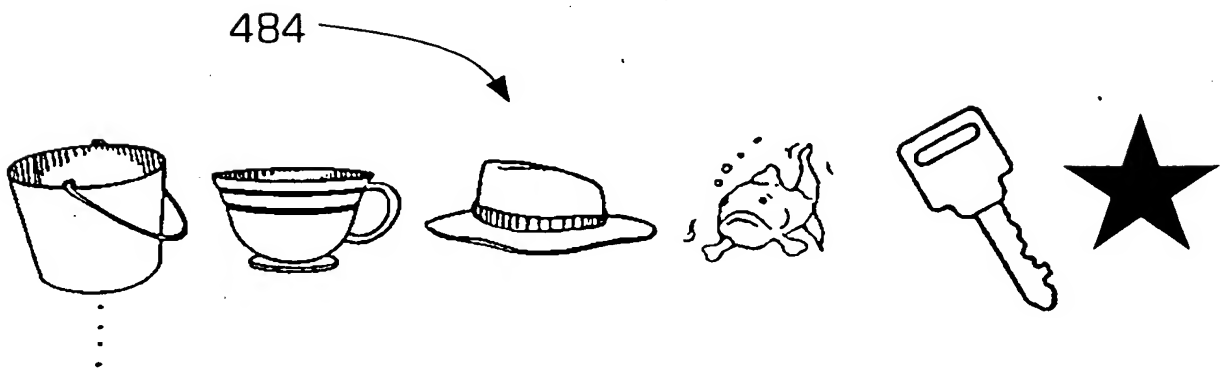


FIGURE 20

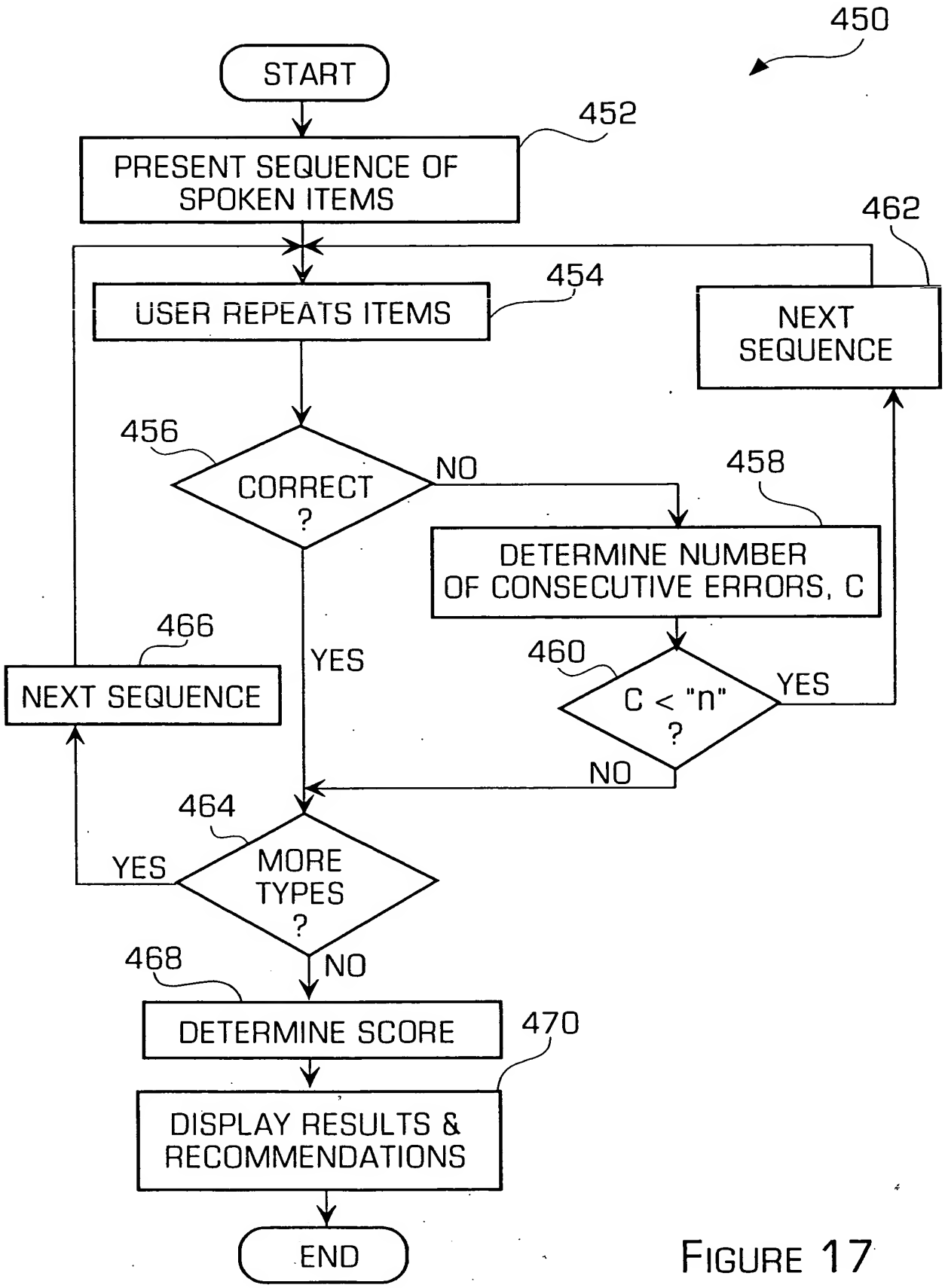

450
START
452
PRESENT SEQUENCE OF SPOKEN ITEMS
462
454
USER REPEATS ITEMS
NEXT SEQUENCE
456
CORRECT ?
NO
458
DETERMINE NUMBER OF CONSECUTIVE ERRORS, C
466
YES
460
C < "n" ?
YES
NEXT SEQUENCE
NO
464
YES
MORE TYPES ?
NO
468
DETERMINE SCORE
470
DISPLAY RESULTS & RECOMMENDATIONS
END

FIGURE 17

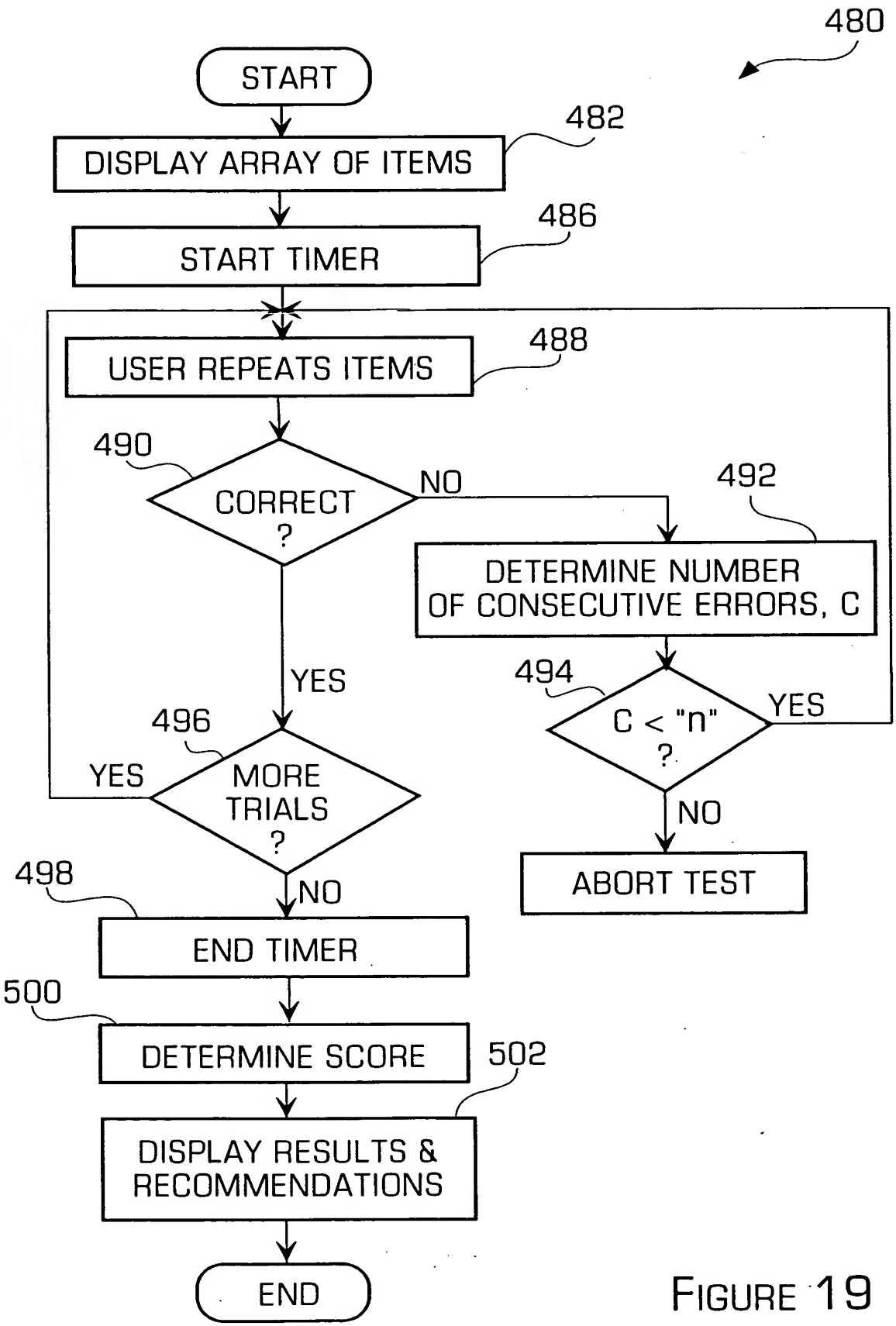

480
START
482
DISPLAY ARRAY OF ITEMS
486
START TIMER
488
USER REPEATS ITEMS
490
CORRECT ?
NO
492
DETERMINE NUMBER OF CONSECUTIVE ERRORS, C
YES
494
C < "n" ?
YES
NO
ABORT TEST
496
MORE TRIALS ?
YES
NO
498
END TIMER
500
DETERMINE SCORE
502
DISPLAY RESULTS & RECOMMENDATIONS
END

FIGURE 19

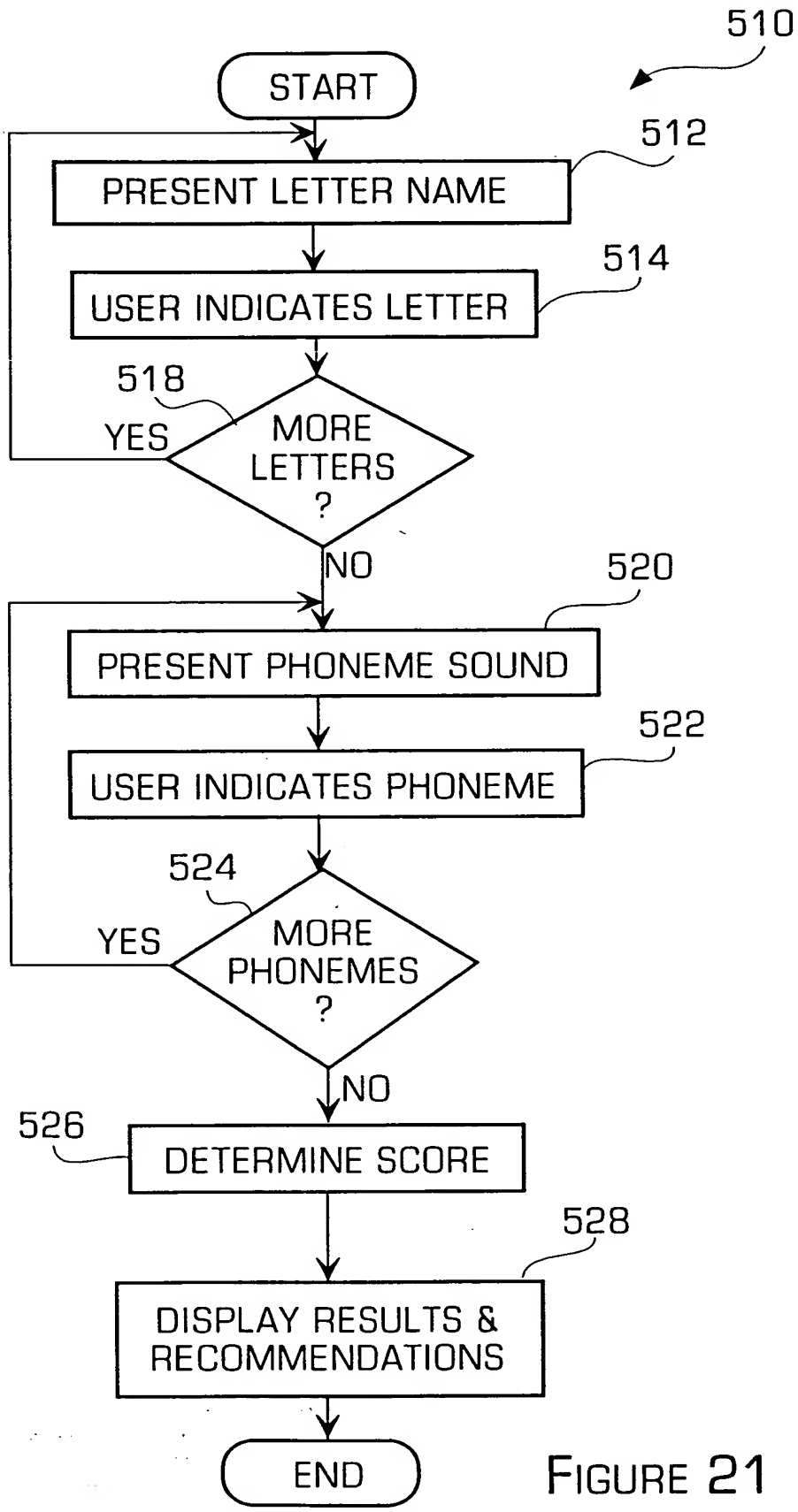

510
START
512
PRESENT LETTER NAME
514
USER INDICATES LETTER
518
YES
MORE LETTERS ?
NO
520
PRESENT PHONEME SOUND
522
USER INDICATES PHONEME
524
YES
MORE PHONEMES ?
NO
526
DETERMINE SCORE
528
DISPLAY RESULTS & RECOMMENDATIONS
END

FIGURE 21

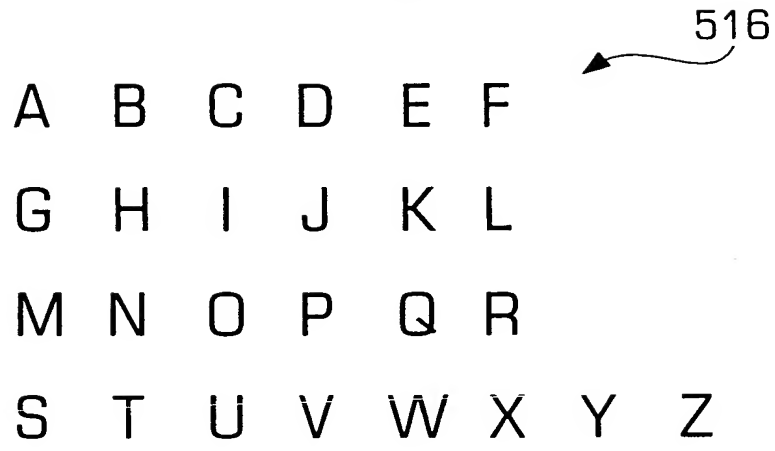


FIGURE 22

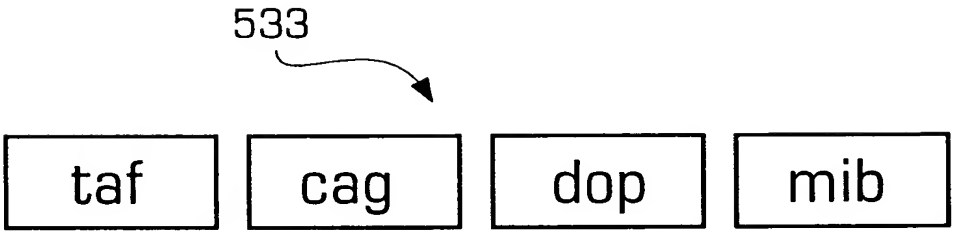


FIGURE 24

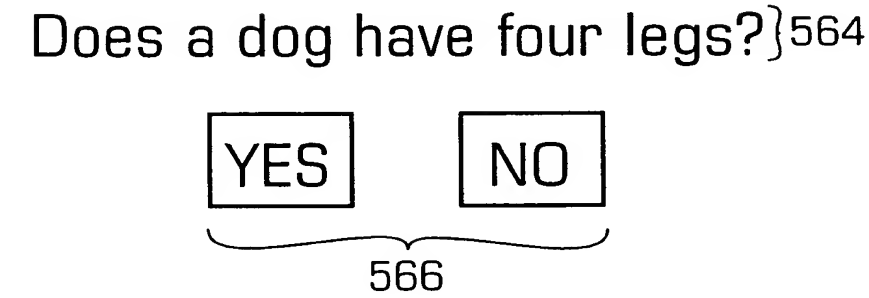


FIGURE 26

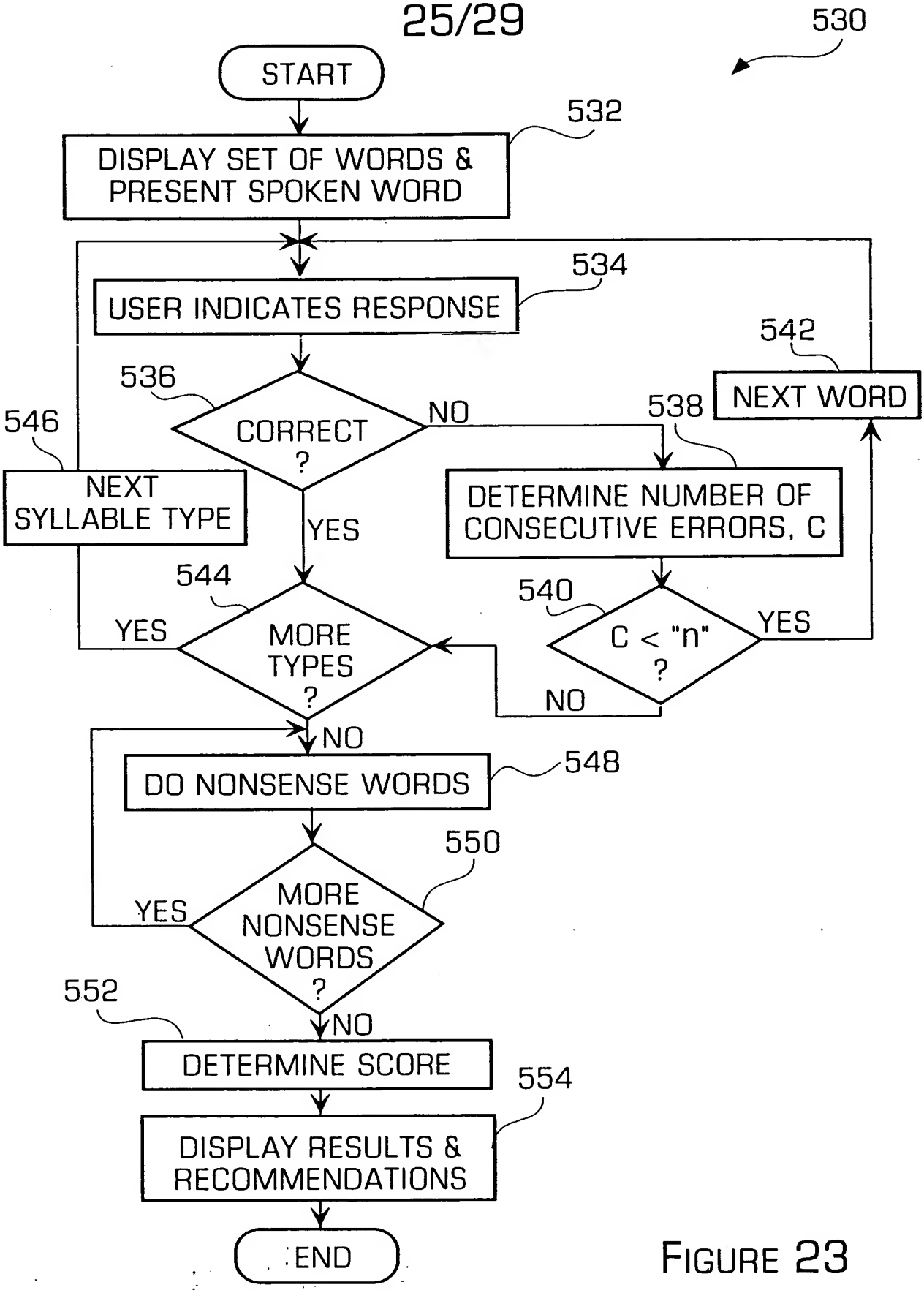

530
START
532
DISPLAY SET OF WORDS & PRESENT SPOKEN WORD
534
USER INDICATES RESPONSE
536
CORRECT ?
NO
538
DETERMINE NUMBER OF CONSECUTIVE ERRORS, C
542
NEXT WORD
546
NEXT SYLLABLE TYPE
YES
544
MORE TYPES ?
YES
540
C < "n" ?
YES
NO
NO
548
DO NONSENSE WORDS
550
MORE NONSENSE WORDS ?
YES
552
NO
DETERMINE SCORE
554
DISPLAY RESULTS & RECOMMENDATIONS
END

FIGURE 23

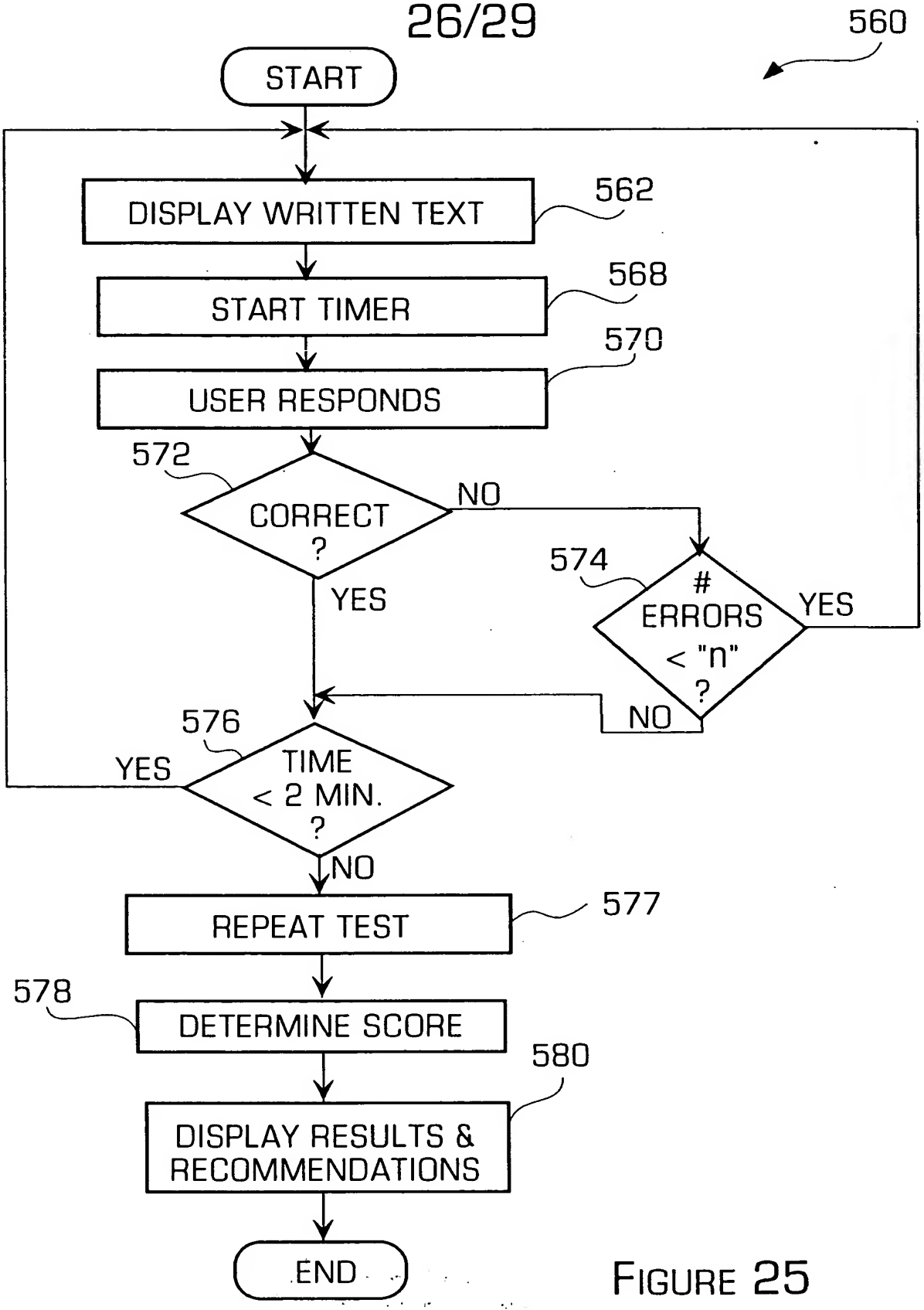

560
START
562
DISPLAY WRITTEN TEXT
568
START TIMER
570
USER RESPONDS
572
CORRECT ?
NO
YES
574
ERRORS < "n" ?
YES
NO
576
TIME < 2 MIN. ?
YES
NO
577
REPEAT TEST
578
DETERMINE SCORE
580
DISPLAY RESULTS & RECOMMENDATIONS
END

FIGURE 25

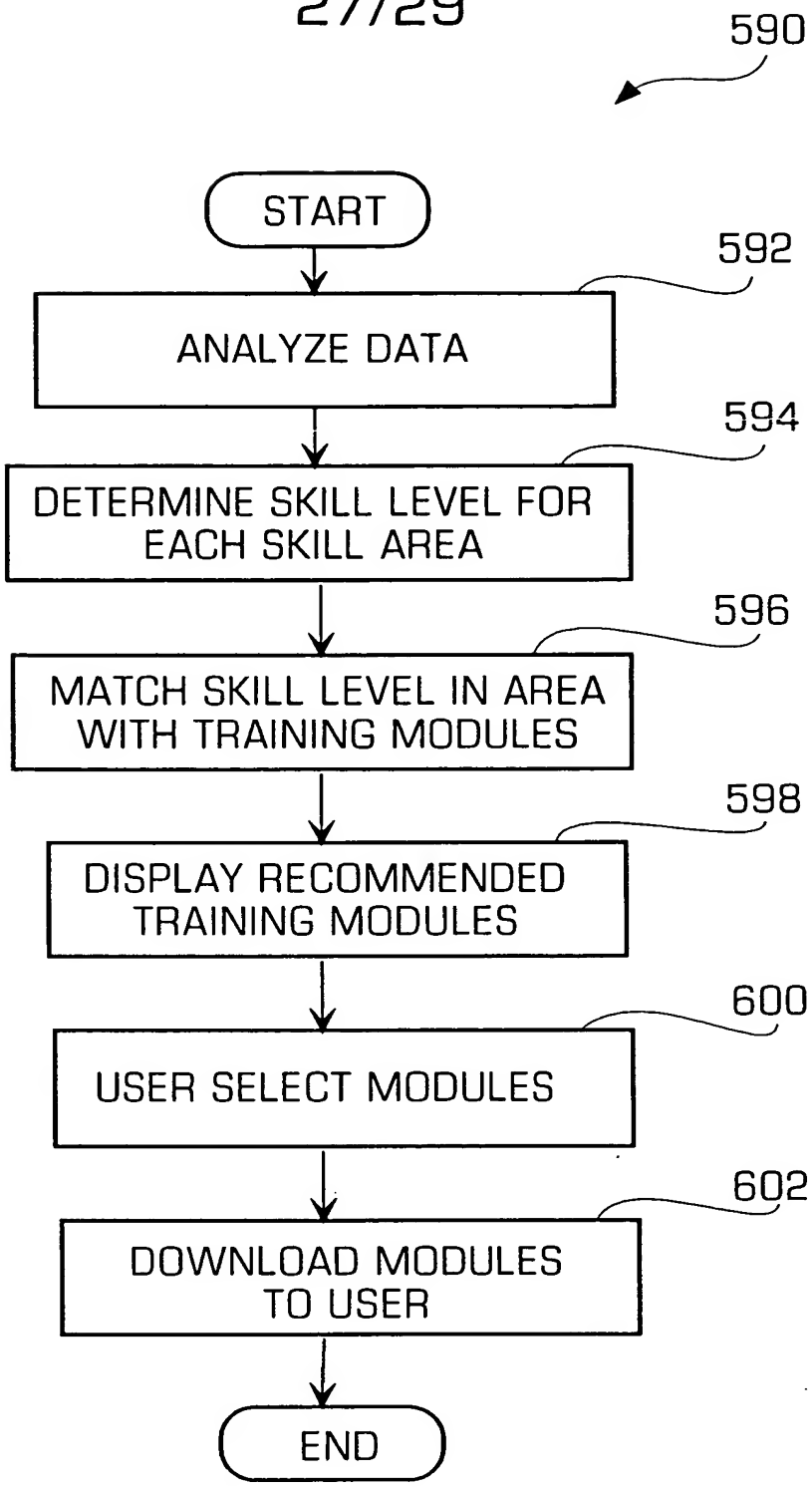

590
START
592
ANALYZE DATA
594
DETERMINE SKILL LEVEL FOR EACH SKILL AREA
596
MATCH SKILL LEVEL IN AREA WITH TRAINING MODULES
598
DISPLAY RECOMMENDED TRAINING MODULES
600
USER SELECT MODULES
602
DOWNLOAD MODULES TO USER
END

FIGURE 27

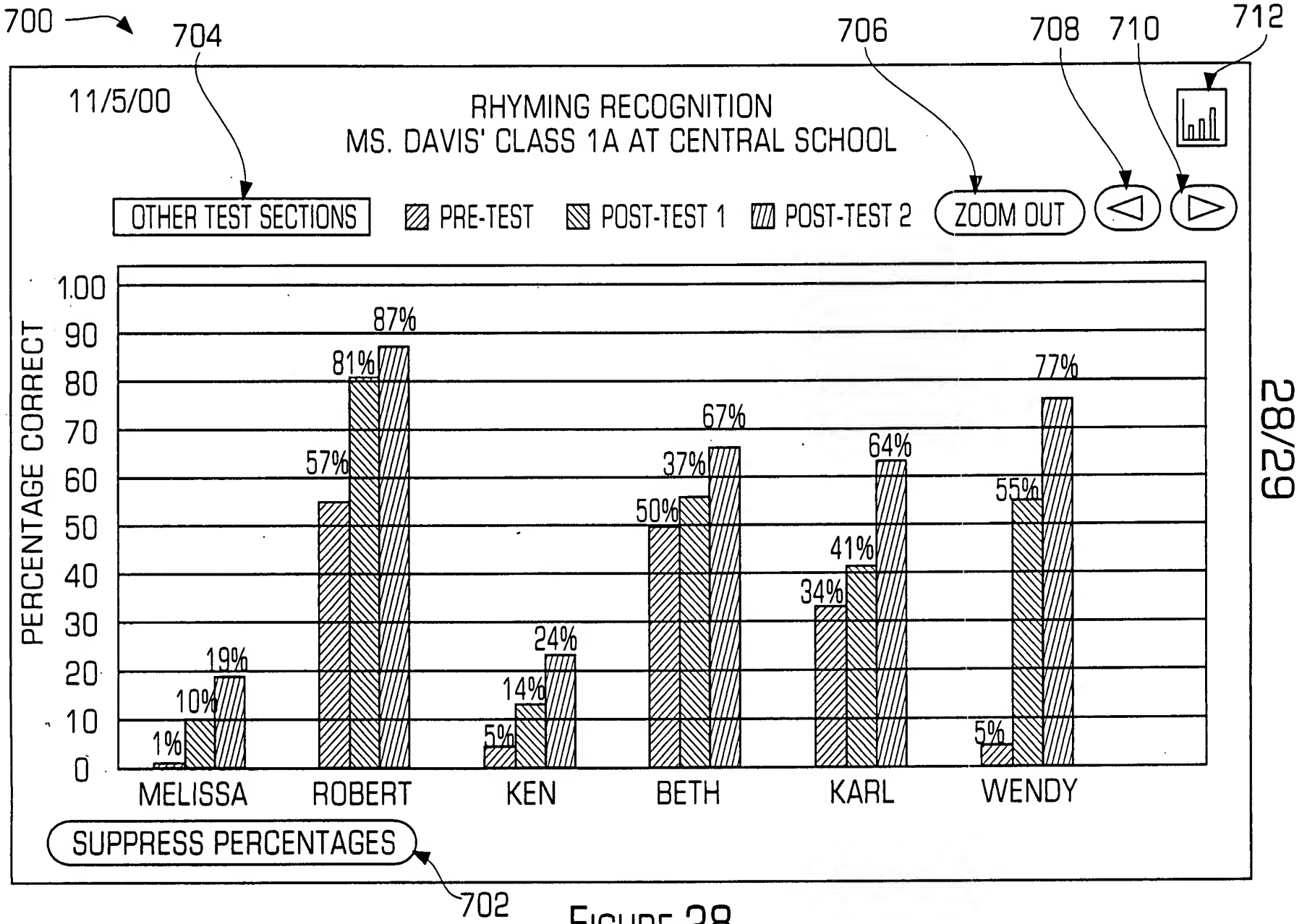

700
704
706
708
710
712
11/5/00
RHYMING RECOGNITION
MS. DAVIS' CLASS 1A AT CENTRAL SCHOOL
OTHER TEST SECTIONS
PRE-TEST
POST-TEST 1
POST-TEST 2
ZOOM OUT
PERCENTAGE CORRECT
100
90
80
70
60
50
40
30
20
10
0
1%
10%
19%
57%
81%
87%
5%
14%
24%
50%
37%
67%
34%
41%
64%
5%
55%
77%
MELISSA
ROBERT
KEN
BETH
KARL
WENDY
SUPPRESS PERCENTAGES
702

FIGURE 28

740

RHYME RECOGNITION
RHYME GENERATION
BEGINNING AND ENDING SOUNDS
BLENDING
SEGMENTING
MANIPULATING
RECALLING IN SEQUENTIAL ORDER
RAPID NAMING
LETTER NAMES AND SOUND
DECODING
FLUENT READING

FIGURE 29

750

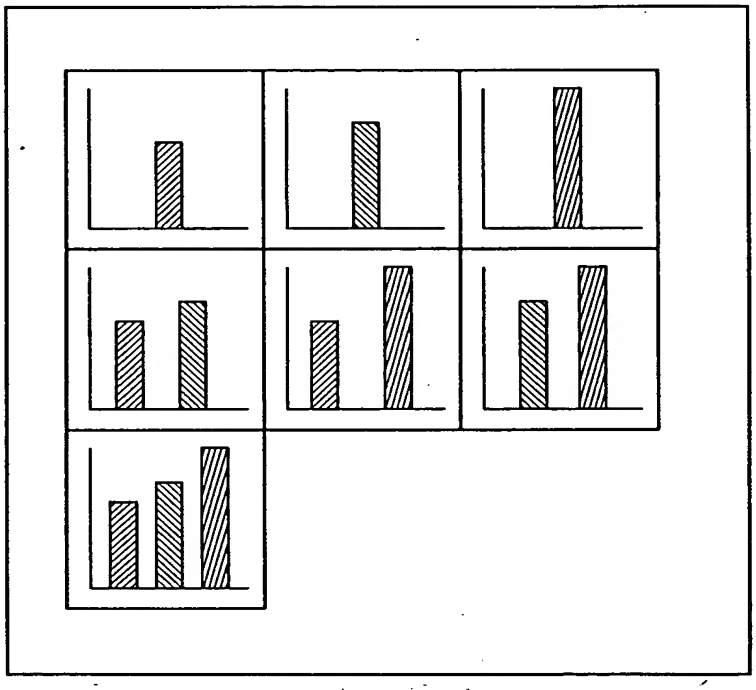


FIGURE 30